

1. A communication system comprising:

a first circuit bonding device;

a second circuit bonding device;

a third circuit bonding device;

5 first bonded circuits coupling the first circuit bonding system and the second circuit bonding system;

second bonded circuits coupling the first circuit bonding system and the third circuit bonding system;

10 third bonded circuits coupling the second circuit bonding device and the third circuit bonding device;

the first circuit bonding device configured to receive first communications from a first user and transfer the first communications over the first bonded circuits to the second circuit bonding device and receive second communications from the first user and transfer the second communications over the second bonded circuits to the third circuit bonding device;

15 the second circuit bonding device configured to receive third communications from a second user and transfer the third communications over the first bonded circuits to the first circuit bonding device and receive fourth communications from the second user and transfer the fourth communications over the third bonded circuits to the third circuit bonding device;

20 the third circuit bonding device configured to receive fifth communications from a third user and transfer the fifth communications over the second bonded circuits to the first circuit bonding device and receive sixth communications from the third user and

transfer the sixth communications over the third bonded circuits to the second circuit bonding device;

the first circuit bonding device configured to receive the third communications from the first bonded circuits and transfer the third communications to the first user and  
5 receive the fifth communications from the second bonded circuits and transfer the fifth communications to the first user;

the second circuit bonding device configured to receive the first communications from the first bonded circuits and transfer the first communications to the second user and receive the sixth communications from the third bonded circuits and transfer the sixth  
10 communications to the second user; and

the third circuit bonding device configured to receive the second communications from the second bonded circuits and transfer the second communications to the third user and receive the fourth communications from the third bonded circuits and transfer the fourth communications to the third user.

2. The communication system of claim 1 wherein if a fault occurs on the second bonded circuits:

the first circuit bonding device is configured to automatically transfer the second communications over the first bonded circuits to the second circuit bonding device in response to the fault;

the second circuit bonding device is configured to automatically receive the second communications from the first bonded circuits and transfer the second communications over the third bonded circuits to the third circuit bonding device in response to the fault; and

the third circuit bonding device is configured to automatically receive the second communications from the third bonded circuits in response to the fault.

3. The communication system of claim 2 wherein:

the third circuit bonding device is configured to automatically transfer the fifth communications over the third bonded circuits to the second circuit bonding device in response to the fault;

the second circuit bonding device is configured to automatically receive the fifth communications from the third bonded circuits and transfer the fifth communications over the first bonded circuits to the first circuit bonding device in response to the fault; and

the first circuit bonding device is configured to automatically receive the fifth communications from the first bonded circuits in response to the fault.

4. The communication system of claim 2 wherein:

the first circuit bonding device and the second circuit bonding device are configured to automatically reallocate bandwidth on the first bonded circuits from the first communications to the second communications in response to the fault; and

5 the second circuit bonding device and the third circuit bonding device are configured to automatically reallocate bandwidth on the third bonded circuits from the fourth communications to the second communications in response to the fault.

5. The communication system of claim 1 wherein if the first user requires a traffic burst  
10 to the third user:

the first circuit bonding device is configured to receive seventh communications for the traffic burst from the first user and automatically transfer the seventh communications over the first bonded circuits to the second circuit bonding device in response to the traffic burst;

15 the second circuit bonding device is configured to automatically receive the seventh communications from the first bonded circuits and transfer the seventh communications over the third bonded circuits to the third circuit bonding device in response to the traffic burst; and

the third circuit bonding device is configured to automatically receive the seventh  
20 communications from the third bonded circuits and transfer the seventh communications to the third user in response to the traffic burst.

6. The communication system of claim 5 wherein:

the first circuit bonding device and the second circuit bonding device are configured to automatically reallocate bandwidth on the first bonded circuits from the first communications to the seventh communications in response to the traffic burst; and

5 the second circuit bonding device and the third circuit bonding device are configured to automatically reallocate bandwidth on the third bonded circuits from the fourth communications to the seventh communications in response to the traffic burst.

7. The communication system of claim 1 further comprising:

10 a bonding device control system configured to receive user commands, and in response to the user commands, to transfer a first device command to the first circuit bonding device, transfer a second device command to the second circuit bonding device, and transfer a third device command to the third circuit bonding device; and wherein

the first circuit bonding device is configured to receive the first device command,  
15 and in response, to receive seventh communications from the first user and transfer the seventh communications over the first bonded circuits to the second circuit bonding device;

the second circuit bonding device is configured to receive the second device command, and in response, to receive the seventh communications from the first bonded  
20 circuits and transfer the seventh communications over the third bonded circuits to the third circuit bonding device; and

the third circuit bonding device is configured to receive the third device command, and in response, to receive the seventh communications from the third bonded circuits and transfer the seventh communications to the third user.

8. The communication system of claim 7 wherein:

the first circuit bonding device and the second circuit bonding device are configured to reallocate bandwidth on the first bonded circuits from the first communications to the seventh communications in response to the first device command

5 and the second device command; and

the second circuit bonding device and the third circuit bonding device are configured to reallocate bandwidth on the third bonded circuits from the fourth communications to the seventh communications in response to the second device command and the third device command.

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9. The communication system of claim 1 wherein the first bonded circuits, the second bonded circuits, and the third bonded circuits comprise unbundled network elements.

10. The communication system of claim 1 wherein:

the first communications received from the first user into the first circuit bonding device and transferred from the second circuit bonding device to the second user comprise Ethernet communications;

5 the second communications received from the first user into the first circuit bonding device and transferred from the third circuit bonding device to the third user comprise Ethernet communications;

the third communications received from the second user into the second circuit bonding device and transferred from the first circuit bonding device to the first user  
10 comprise Ethernet communications;

the fourth communications received from the second user into the second circuit bonding device and transferred from the third circuit bonding device to the third user comprise Ethernet communications;

the fifth communications received from the third user into the third circuit bonding device and transferred from the first circuit bonding device to the first user  
15 comprise Ethernet communications; and

the sixth communications received from the third user into the third circuit bonding device and transferred from the second circuit bonding device to the second user comprise Ethernet communications.

11. A method of operating a communication system comprising a first circuit bonding device, a second circuit bonding device, a third circuit bonding device, first bonded circuits coupling the first circuit bonding system and the second circuit bonding system, second bonded circuits coupling the first circuit bonding system and the third circuit bonding system, and third bonded circuits coupling the second circuit bonding device and the third circuit bonding device, the method comprising:

in the first circuit bonding device, receiving first communications from a first user and transferring the first communications over the first bonded circuits to the second circuit bonding device and receiving second communications from the first user and transferring the second communications over the second bonded circuits to the third circuit bonding device;

in the second circuit bonding device, receiving third communications from a second user and transferring the third communications over the first bonded circuits to the first circuit bonding device and receiving fourth communications from the second user and transferring the fourth communications over the third bonded circuits to the third circuit bonding device;

in the third circuit bonding device, receiving fifth communications from a third user and transferring the fifth communications over the second bonded circuits to the first circuit bonding device and receiving sixth communications from the third user and transferring the sixth communications over the third bonded circuits to the second circuit bonding device;

in the first circuit bonding device, receiving the third communications from the first bonded circuits and transferring the third communications to the first user and



receiving the fifth communications from the second bonded circuits and transferring the fifth communications to the first user;

in the second circuit bonding device, receiving the first communications from the first bonded circuits and transferring the first communications to the second user and  
5 receiving the sixth communications from the third bonded circuits and transferring the sixth communications to the second user; and

in the third circuit bonding device, receiving the second communications from the second bonded circuits and transferring the second communications to the third user and receiving the fourth communications from the third bonded circuits and transferring the  
10 fourth communications to the third user.

12. The method of claim 11 wherein if a fault occurs on the second bonded circuits:

in the first circuit bonding device, automatically transferring the second communications over the first bonded circuits to the second circuit bonding device in  
15 response to the fault;

in the second circuit bonding device, automatically receiving the second communications from the first bonded circuits and transferring the second communications over the third bonded circuits to the third circuit bonding device in response to the fault; and

20 in the third circuit bonding device, automatically receiving the second communications from the third bonded circuits in response to the fault.

13. The method of claim 12 further comprising:

in the third circuit bonding device, automatically transferring the fifth communications over the third bonded circuits to the second circuit bonding device in response to the fault;

5 in the second circuit bonding device, automatically receiving the fifth communications from the third bonded circuits and transferring the fifth communications over the first bonded circuits to the first circuit bonding device in response to the fault; and

in the first circuit bonding device, automatically receiving the fifth  
10 communications from the first bonded circuits in response to the fault.

14. The method of claim 12 further comprising:

in the first circuit bonding device and the second circuit bonding device, automatically reallocating bandwidth on the first bonded circuits from the first  
15 communications to the second communications in response to the fault; and

in the second circuit bonding device and the third circuit bonding device, automatically reallocating bandwidth on the third bonded circuits from the fourth communications to the second communications in response to the fault.

15. The method of claim 11 wherein if the first user requires a traffic burst to the third user:

in the first circuit bonding device, receiving seventh communications for the traffic burst from the first user and automatically transferring the seventh

5 communications over the first bonded circuits to the second circuit bonding device in response to the traffic burst;

in the second circuit bonding device, automatically receiving the seventh communications from the first bonded circuits and transferring the seventh communications over the third bonded circuits to the third circuit bonding device in

10 response to the traffic burst; and

in the third circuit bonding device, automatically receiving the seventh communications from the third bonded circuits and transferring the seventh communications to the third user in response to the traffic burst.

15 16. The method of claim 15 further comprising:

in the first circuit bonding device and the second circuit bonding device, automatically reallocating bandwidth on the first bonded circuits from the first communications to the seventh communications in response to the traffic burst; and

20 in the second circuit bonding device and the third circuit bonding device, automatically reallocating bandwidth on the third bonded circuits from the fourth communications to the seventh communications in response to the traffic burst.

17. The method of claim 11 wherein the communication system further comprises a bonding device control system, further comprising

in the bonding device control system, receiving user commands, and in response to the user commands, transferring a first device command to the first circuit bonding  
5 device, transferring a second device command to the second circuit bonding device, and transferring a third device command to the third circuit bonding device;

in the first circuit bonding device, receiving the first device command, and in response, receiving seventh communications from the first user and transferring the seventh communications over the first bonded circuits to the second circuit bonding  
10 device;

in the second circuit bonding device, receiving the second device command, and in response, receiving the seventh communications from the first bonded circuits and transferring the seventh communications over the third bonded circuits to the third circuit bonding device; and

15 in the third circuit bonding device, receiving the third device command, and in response, receiving the seventh communications from the third bonded circuits and transferring the seventh communications to the third user.

18. The method of claim 17 further comprising:

in the first circuit bonding device and the second circuit bonding device,  
reallocating bandwidth on the first bonded circuits from the first communications to the  
seventh communications in response to the first device command and the second device  
5 command; and

in the second circuit bonding device and the third circuit bonding device,  
reallocating bandwidth on the third bonded circuits from the fourth communications to  
the seventh communications in response to the second device command and the third  
device command.

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19. The method of claim 11 wherein the first bonded circuits, the second bonded circuits,  
and the third bonded circuits comprise unbundled network elements.

20. The method of claim 11 wherein:

the first communications received from the first user into the first circuit bonding device and transferred from the second circuit bonding device to the second user comprise Ethernet communications;

5 the second communications received from the first user into the first circuit bonding device and transferred from the third circuit bonding device to the third user comprise Ethernet communications;

the third communications received from the second user into the second circuit bonding device and transferred from the first circuit bonding device to the first user  
10 comprise Ethernet communications;

the fourth communications received from the second user into the second circuit bonding device and transferred from the third circuit bonding device to the third user comprise Ethernet communications;

the fifth communications received from the third user into the third circuit bonding device and transferred from the first circuit bonding device to the first user  
15 comprise Ethernet communications; and

the sixth communications received from the third user into the third circuit bonding device and transferred from the second circuit bonding device to the second user comprise Ethernet communications.